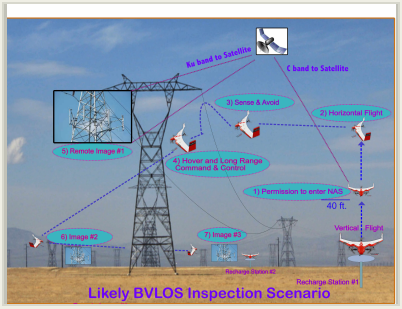
Innovation in the Sky, Phase I

Completed Technology Project (2016 - 2016)

Project Introduction

This proposal presents a scope of work to develop a total product solution for Beyond Visual Line of Sight [BVLOS] Unmanned Aerial Vehicle [UAV] operations. Our focus is on technology development to increase the safety and efficacy of the commercial UAV air transportation system. The goal is to improve autonomous and safe UAV operations for the first/last 50 feet (and beyond) under diverse weather conditions. In particular we focus on a UAV electronics package to provide the following system solution: a) BVLOS communications; b) track/locate; c) sense/avoid; d) long endurance flight; e) long range command/control; f) remote imaging and g) first person video. The solution we propose has a reasonably clear path to regulatory approval for spectrum and flight certification. First and foremost, the regulatory agencies need to be satisfied that the industry is safe. To be safe we need to develop autonomous [and semi-autonomous] concepts that can be scaled into today's airspace operations. Second, there are still features missing from a whole product solution. The commercial world invests in productivity improvements - anything less is simply too much work for the potential customer. We believe that it is possible to design/build a small, relatively inexpensive UAV that can a) reliably and ubiquitously communicate it's location vector; b) avoid obstacles; c) fly for more than 2 hours; d) do hover and horizontal flight; e) be commanded even outside of terrestrial radio line of sight; f) send back targeted high resolution images and g) (maybe) provide first person video. We suggest in the interest of time-to-market, an initial focus on semi-autonomous UAV flight instead of full autonomy. Semi-autonomous flight permits a human in the loop for unusual events and extraordinary situations that are difficult to plan (like the first/last 50 feet). Fully autonomous flight is likely not worth that substantial incremental investment.



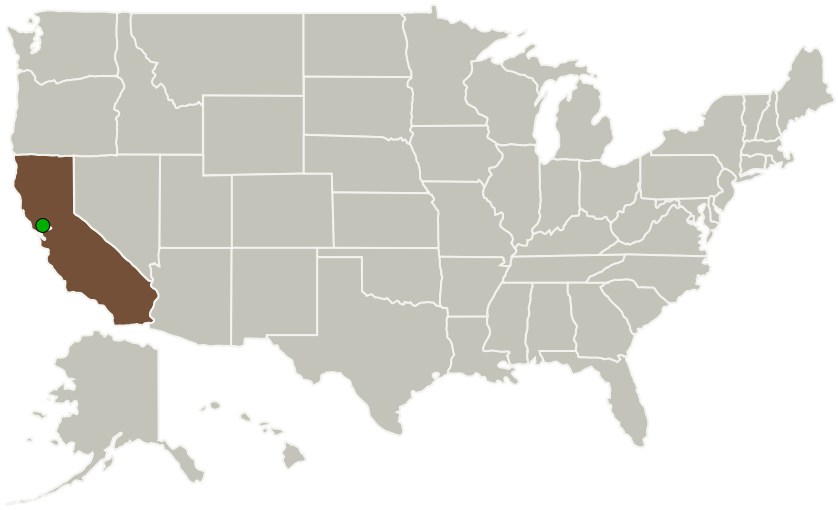
Innovation in the Sky, Phase I

Table of Contents

Innovation in the Sky, Phase I

Completed Technology Project (2016 - 2016)

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Higher Ground	Lead Organization	Industry	Palo Alto, California
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations
California

Project Transitions

June 2016: Project Start

December 2016: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140216)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Higher Ground

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

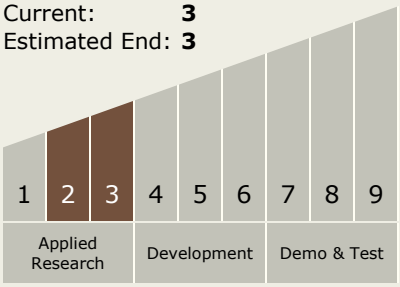
Carlos Torrez

Principal Investigator:

Robert S Reis

Technology Maturity (TRL)

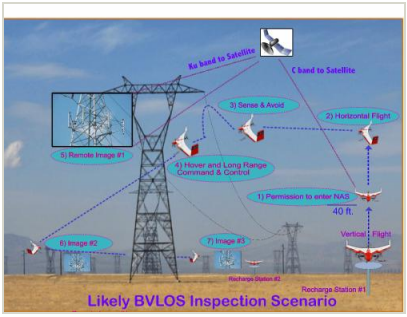
Start: **2**
Current: **3**
Estimated End: **3**



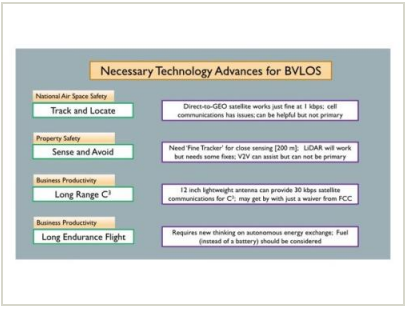
Innovation in the Sky, Phase I

Completed Technology Project (2016 - 2016)

Images



Briefing Chart Image
Innovation in the Sky, Phase I
(https://techport.nasa.gov/image/132333)



Final Summary Chart Image
Innovation in the Sky, Phase I Project Image
(https://techport.nasa.gov/image/128548)

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.4 Aeroacoustics

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System